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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Nathaniel Frampton

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09/26/2006

U.S. ARMY TACOM-ARDEC

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PICATINNY ARSENAL, NJ 07806-5000

EXAMINER

CRAIG, DWIN M

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 09/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/707,879		FRAMPTON ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Dwin M. Craig		2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 9, 14, 18 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)            | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-22 have been presented for examination.

#### ***Specification***

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

- 2.1 Applicants' current abstract is written in the manner and language of a claim, the examiner requires that a new abstract be submitted that is more narrative and descriptive of Applicants' invention.

#### ***Claim Objections***

3. Claims 9, 18 and 21 are objected to because the abbreviation "COM" is being used in the claim. The claims should have the phrase "Component Object Model" amended into the claim in order to clarify the metes and bounds of the claimed subject matter. The examiner notes that the Applicants' have defined the term "COM" in paragraph [0091] of the specification. Amendment is required.

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3.1 Claim 14 is objected to because of the use of the word “*about*” the claim language is unclear as to the metes and bounds of the claimed subject matter, see MPEP section 2173.05 “Relative terminology”. Amendment and clarification is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1-13 and 15-22 are rejected under 35 USC § 103(a) as being unpatentable over US Patent 6,726,764 Mutti in view of US Patent 6,559,860 Hamilton.

4.1 As regards independent claims 1 and 15 and using independent claim 1 as an example, *Mutti* teaches, *a model based crystallization controller* (Figure 1, reference 51 and Col. 2 lines 15-16, Col. 7 lines 1-8 and Col. 8 lines 7-20), *comprising: a model, wherein at least one modeled component and at least one crystallization recipe model, (Col. 8 lines 7-20) and wherein each of said at least one modeled components is communicatively connected to at least one of said at least one recipe models; (Col. 6 lines 59-67 and Col. 7 lines 1-8 and Col. 8 lines 45-56 and Col. 12 lines 51-67) an executor resident above said plurality that coordinates at least one of the modeled components with at least one of the recipes to provide for control of a crystallization correspondent to said at least one recipe model (Col. 9 lines 65-67).*

However, *Mutti* does not expressly disclose, *a plurality of models, providing a virtual control (simulation) and at least one interface that communicatively connects the executor to the crystallization, wherein said at least one interface converts the virtual control to actual control of the crystallization.*

*Hamilton* teaches, *a plurality of models* (Figures 2 & 6 reference 72 “objects”, & 11-15 and Col. 4 lines 5-20), *providing a virtual control (simulation) (Col. 1 lines 28-41 and Col. 17 lines 57-63) and at least one interface that communicatively connects the executor, wherein said at least one interface converts the virtual control to actual control (Figures 1, 4, 8 & 10 and Col. 11 lines 29-67 and Col. 12).*

*Mutti* and *Hamilton* are analogous art because they are from the same problem solving area of programming model-based controllers to control a process using a recipe.

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At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have used the virtual control methods of *Hamilton* with the crystal control methods of *Mutti*.

The suggestion for doing so would have been so that the control and design of the software that is needed in model based control can be easily and inexpensively developed without having to rely upon the assistance of computer programmers and specially designed custom software (*Hamilton* Col 1 lines 59-65).

Therefore, it would have been obvious to combine *Hamilton* with *Mutti* to obtain the invention as specified in claims 1-13 and 15-22.

4.2 As regards dependent claim 2, *Mutti* teaches, *crystal growth over time within a predetermined tolerance for growth rate* (Figures 2 & 3 and Col. 2 lines 60-67 and Col. 3 lines 1-25).

4.3 As regards dependent claim 3, *Mutti* teaches, *wherein an increased temperature stimulates the growth rate* (Figures 2 & 3 and Col. 2 lines 60-67 and Col. 3 lines 1-25 and Col. 3 lines 50-67 and Col. 4 lines 1-17).

4.4 As regards dependent claim 4, *Mutti* teaches, *wherein an increased feed rate stimulates the growth rate* (Col. 2 lines 28-48 & Col. 4 lines 17-46 *pull rate is the functional equivalent of feed rate* and Col. 3 lines 50-67 and Col. 4 lines 1-17).

4.5 As regards dependent claim 5, *Mutti* teaches, *wherein a catalyst stimulates growth rate* (Col. 3 lines 50-67 and Col. 4 lines 1-17).

4.6 As regards dependent claims 6 & 16, *Mutti* does not expressly disclose, *wherein the virtual control comprises real time control*.



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*Hamilton discloses, wherein the virtual control comprises real time control (Col. 16 lines 42-63).*

**4.7** As regards dependent claims 7 and 17, *Mutti teaches, controls at least two selected from the group consisting of heat loss, at least one valve overshoot, rising temperature, and feed volume (Col. 6 lines 39-58).*

**4.8** As regards dependent claim 8, *Mutti teaches, wherein at least one tolerance is maintained in real time by the control, and wherein one of the at least one tolerance comprises a feed volume over a number of seconds to be added to the crystallization to maintain a crystal growth temperature (Figure 2 and Col. 7 lines 9-29).*

**4.9** As regards dependent claims 9 & 18, *Mutti does not expressly disclose, wherein said at least one interface comprises at least one COM interface.*

However, *Hamilton teaches, wherein said at least one interface comprises at least one COM interface (Col. 12 lines 13-40).*

**4.10** As regards dependent claims 10 & 19, *Mutti teaches wherein said at least one recipe comprises at least two equations each having at least two predetermined coefficients and at least two variables (Col. 8 lines 45-67 and Col. 9-12 and Col. 13 lines 1-12).*

**4.11** As regards dependent claim 11, *Mutti teaches, wherein said at least one recipe provides for modification of at least one of the at least two variables by the executor for virtual control (Col. 9 lines 60-67 and Col. 10 lines 1-7).*

**4.12** As regards dependent claim 12, *Mutti teaches wherein said at least one interface provides feedback to said executor of the actual control, and wherein the feedback allows said at least one*

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*recipe to modify at least one of the at two variables (Col. 9 lines 60-67 and Col. 10 lines 1-7 and Figure 1 note the line from the reference block 43 to control unit 51).*

4.13 As regards dependent claims 13 & 20, *Mutti* does not expressly disclose, *further comprising at least one integrated developer associated with said executor, wherein said at least one recipe is developed within said at least one integrated developer.*

However, *Hamilton* discloses, *further comprising at least one integrated developer associated with said executor, wherein said at least one recipe is developed within said at least one integrated developer (Col. 3 lines 62-67 and Col. 4 lines 1-20 and Col. 11 lines 15-67 and Col. 12 lines 1-58).*

*pm* 4.14 As regards independent claim <sup>21</sup>~~20~~, *Mutti* discloses, *a method of controlling at least one chemical process, comprising: modeling a recipe of a performance of the at least one chemical process to a modeled recipe; modeling at least one device that engages the performance of the at least one chemical process to a modeled device (Figure 1, reference 51 and Col. 2 lines 15-16, Col. 7 lines 1-8 and Col. 8 lines 7-20 and Col. 8 lines 7-20 and Col. 6 lines 59-67 and Col. 7 lines 1-8 and Col. 8 lines 45-56 and Col. 12 lines 51-67 and Col. 9 lines 65-67).*

However, *Mutti* does not expressly disclose, *communicatively connecting the modeled device to the modeled recipe in a model executor; coordinating, within the model executor, the modeled device with the modeled recipe to provide virtual control of the modeled device by the modeled recipe; and converting the virtual control to actual control of the at least one device via a COM interface. It is noted by the Examiner that *Mutti* does teach a modeled recipe.*

*Hamilton* discloses, *communicatively connecting the modeled device to the modeled recipe in a model executor; coordinating, within the model executor, the modeled device with the*



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*modeled recipe to provide virtual control of the modeled device by the modeled recipe; and converting the virtual control to actual control of the at least one device via a COM interface* (Col. 1 lines 28-41 and Col. 17 lines 57-63 and Col. 12 lines 13-40 and Figures 1, 4, 8 & 10 and Col. 11 lines 29-67 and Col. 12).

4.15 As regards dependent claim 22 *Mutti* teaches, distributing at least two of the at least one mechanical devices remotely from each other; and associating the executor with a location of one of the at least two remotely distributed mechanical devices (Figure 1 references 47 and 43 and Col. 5 lines 43-67 and Col. 6 lines 1-58).

5. Dependent claim 14 is rejected under 35 USC § 103(a) as being unpatentable over US *Mutti* as modified by *Hamilton* as applied to claims 1-13 and 15-22 above, and further in view of *Duval et al.* (US Patent 6,139,627).

5.1 *Mutti* as modified by *Hamilton* teaches the model based controller methods recited in claims 1-13 and 15-22 for the reasons above, differing from the invention as recited in claim 14 in that their combined teaching lacks

*(claim 14) wherein the actual control of the crystallization has a minimum crystallizing temperature overshoot in a range of about 1.2 degree F., and a minimum crystallizing temperature undershoot in a range of about fraction (3/10)}ths of a degree F.*

*Duval et al.* substantially teaches, *wherein the actual control of the crystallization has a minimum crystallizing temperature overshoot in a range of about 1.2 degree F., and a minimum crystallizing temperature undershoot in a range of about fraction (3/10)}ths of a degree F* (Figures 1-7 and Col. 7 lines 29-67 and Col. 8 lines 1-61).

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*Mutti* as modified by *Hamilton* and *Duval et al.* are analogous art because they are all related to model based controllers and recipes for process control.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the overshoot temperature controls of *Duval et al.* in the model based controller methods of *Mutti* and *Hamilton* because *Duval et al.* teaches that in order to produce a superior crystal growth furnace it is important to model and control the zone-to-zone thermal inertia created by ampoule movement (Col. 2 lines 50-65).

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. "The CIP method: Component- and Model-Based Construction of Embedded Systems" by Hugo Fierz discloses a software development environment for PLC using a plurality of software models, see pages 375-392.


6.1 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwain M. Craig whose telephone number is (571) 272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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SUPERVISORY PATENT EXAMINER  
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